

# TA-313

*UK Model  
AEP Model  
E Model  
Canadian Model*



## INTEGRATED STEREO AMPLIFIER

### SPECIFICATIONS

#### GENERAL

**Power Requirements:** 240 V ac, 50 Hz (UK model)  
220 V ac (or 120 or 240 V ac adjustable),  
50 Hz (AEP model)  
120, 220, or 240 V ac adjustable, 50/60 Hz  
(E model)  
120 V ac, 60 Hz (Canadian model)


**Power Consumption:** 200 W (UK model)  
170 W (AEP, E model)  
85 W (Canadian model)

**AC Outlets:** 1 switched, 100 W  
(Canadian model) 2 unswitched, total 200 W


**Dimensions:** Approx. 410 (w) x 145 (h) x 280 (d) mm  
16<sup>1</sup>/<sub>4</sub> (w) x 5<sup>3</sup>/<sub>4</sub> (h) x 11<sup>1</sup>/<sub>8</sub> (d) inches  
including projecting parts and controls.

**Weight:** Approx. 6.5 kg, 14 lb 6 oz (net)  
Approx. 7.3 kg, 16 lb 2 oz (in shipping  
carton)

#### SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY SHADING AND  MARK ON THE SCHEMATIC DIAGRAMS, EXPLODED VIEWS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

ATTENTION AU COMPOSANT AYANT RAPPORT  
À LA SÉCURITÉ !

LES COMPOSANTS IDENTIFIÉS PAR UN TRAMÉ ET UNE MARQUE  SUR LES DIAGRAMMES SCHEMATIQUES, LES VUES EXPLOSÉES ET LA LISTE DES PIÈCES SONT CRITIQUES POUR LA SÉCURITÉ DE FONCTIONNEMENT. NE REMPLACER CES COMPOSANTS QUE PAR DES PIÈCES SONY DONT LES NUMÉROS SONT DONNÉS DANS CE MANUEL OU DES SUPPLÉMENTS PUBLIÉS PAR SONY.

— Continued on page 2 —

# SONY®

## SERVICE MANUAL

## SECTION 1

## OUTLINE

## AMPLIFIER SECTION

<b>Continuous RMS Power Output:</b> (rated output) (Less than 0.5% (8 Ω), 0.7% (4 Ω) harmonic distortion)	Both channels driven simultaneously At 20 – 20,000 Hz 25 + 25 W (8 Ω) At 1 kHz 28 + 28 W (8 Ω) According to DIN 45500 25 + 25 W (8 Ω)	<b>Frequency Response:</b> PHONO RIAA equalization curve ±0.5 dB MIC 100 Hz – 10 kHz $+0_{-3}$ dB TUNER } AUX } 10 Hz – 50 kHz $+0_{-3}$ dB TAPE }
<b>Power Bandwidth:</b>	15 Hz – 30 kHz (8 Ω), IHF	<b>Tone Controls:</b> BASS ±8 dB at 100 Hz TREBLE ±8 dB at 10 kHz
<b>Harmonic Distortion:</b>	Less than 0.5% at rated output Less than 0.2% at 1 W output	<b>Loudness:</b> +8 dB at 100 Hz, att. 30 dB
<b>IM Distortion:</b> (60 Hz : 7 kHz = 4 : 1)	Less than 0.5% at rated output Less than 0.2% at 1 W output	<b>Damping Factor:</b> 30 (8 Ω, 1 kHz)

Inputs:	Sensitivity	Impedance	Maximum Input Capability (at 1 kHz, 0.5% distortion)	S/N (weighting network, input level)
PHONO	2.5 mV	50 kΩ	100 mV	76 dB (A, 2.5 mV)
MIC	2.0 mV	10 kΩ	—	—
TUNER AUX TAPE	100 mV	50 kΩ	—	95 dB (A, 150 mV)

Outputs:	Voltage	Impedance
REC OUT	150 mV	10 kΩ
HEADPHONES	Accepts low and high impedance headphones	
SPEAKER	Accepts speakers of 8 – 16 Ω (Canadian model) or 4 – 16 Ω (AEP, UK, E model)	

0 dB = 0.775 V

• MODEL IDENTIFICATION  
— Specification Label—

## UK model

<b>SONY®</b> DAIGEN	INTEGRATED STEREO AMPLIFIER MODEL NO. TA-313 AC 240 V ~ 50 Hz 200 W MADE IN JAPAN
	SERIAL NO.

## E model

<b>SONY®</b> DAIGEN	INTEGRATED STEREO AMPLIFIER MODEL NO. TA-313 AC 120, 220, 240 V ~ 50/60 Hz 170 W MADE IN JAPAN
	SERIAL NO.

## AEP model

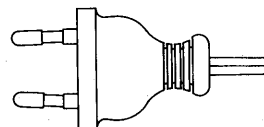
<b>SONY®</b>	INTEGRATED STEREO AMPLIFIER MODEL NO. TA-313 AC 220 V ~ 50 Hz 170 W MADE IN JAPAN
	SERIAL NO.

## Canadian model

<b>SONY®</b> DAIGEN	INTEGRATED STEREO AMPLIFIER MODEL NO. TA-313 AC 120 V 60 Hz 85 W MADE IN JAPAN
	SERIAL NO.

## — Power Cord —

E model: euro-plug (1-551-530-00)



E model: parallel-blade plug (1-534-487-XX)



## 1-1. REVERBERATION CIRCUIT

The TA-313 is equipped with a built-in reverberation unit designed to add a reverberation effect to the input signals from the MIC and TUNER input terminals. An outline of this circuit is shown in Fig. 1. This unit generates reverberation by the "spring" method, rather than the steel plate or echo room methods.

Fig. 2 illustrates the basic operating principle which employs a moving-magnet (MM)-type converter element.

## Operating Principle

L301 in Fig. 1 serves as the actual reverberator unit, employing L1 as the load resistance for Q303.

When a signal is applied to the base of Q303, the amplified signal flows through L1, and a magnetic field will be generated as shown in Fig. 2, resulting in the L1 magnet being forced to rotate in a certain direction. The spring connected to the L1 magnet will also be forced to move in concert with the L1 magnet. But since the other end of this spring is connected to L2 magnet (again see Fig. 2), the current change in L1 will be transferred via the spring to L2. The movement of the L2 magnet then induces an electric current in the coil (in the same way as in a moving-magnet type cartridge), resulting in the voltage being applied to Q304. The time taken to transfer the signal from L1 to L2 is approx. 25 m sec.

In this way, signals applied to the base of Q303 are transferred to Q304 via L301 with the determined time delay. This action alone, however, will not produce the reverberation effect.

When the input signal ceases, the spring which has been forced to rotate together with the L1 magnet, will naturally tend to return to its original position, pulling the magnet back with it. But it will overshoot its original position, and will oscillate (together with the magnet) for a short while until it finally comes to rest in its original position. This rotational oscillation action will result in the magnets at both ends (L1 and L2) overshooting their original positions a number of times, consequently generating proportionally smaller currents in both coils. Signals producing the reverberation effect are thus applied to Q304.

This oscillating spring behaviour may be more readily understood from the illustration in Fig. 3 which shows how a weight attached to the end of a spring gradually returns to its original position after being pulled down.

The signal from the L2 magnet is amplified by Q304 and Q305, and then applied to the mixing control RV301 via C312, R314 and R313. The signal applied to the base of Q303 is also applied directly to the mixing volume control RV301. RV301 adjusts the relative levels of the reverberated signal and non-reverberated signal, operating in much the same way as an ordinary balance control.

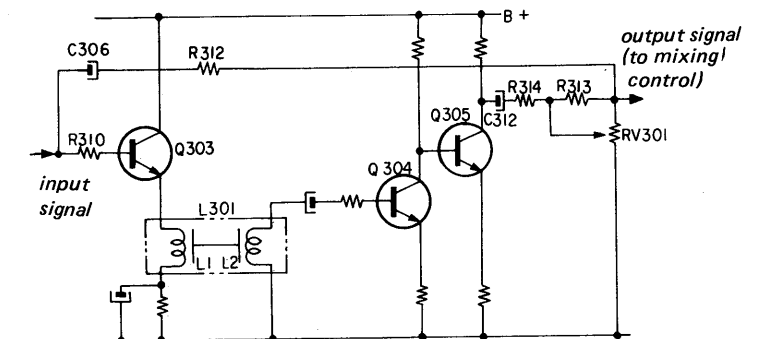


Fig. 1

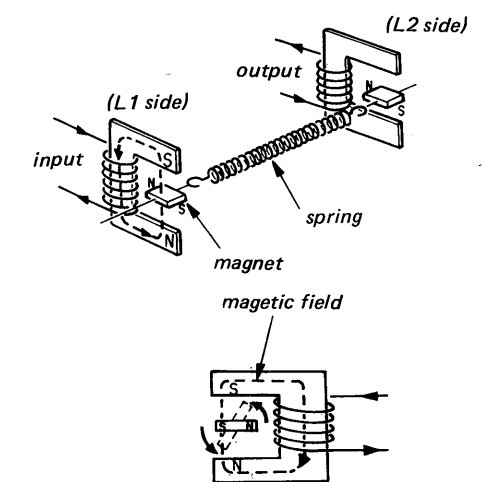


Fig. 2

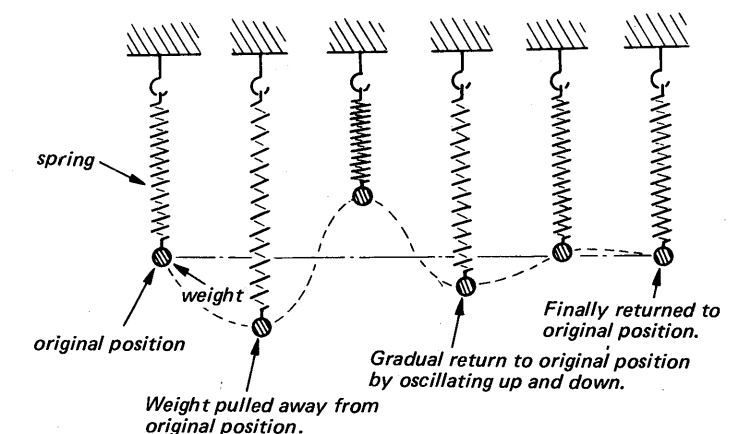
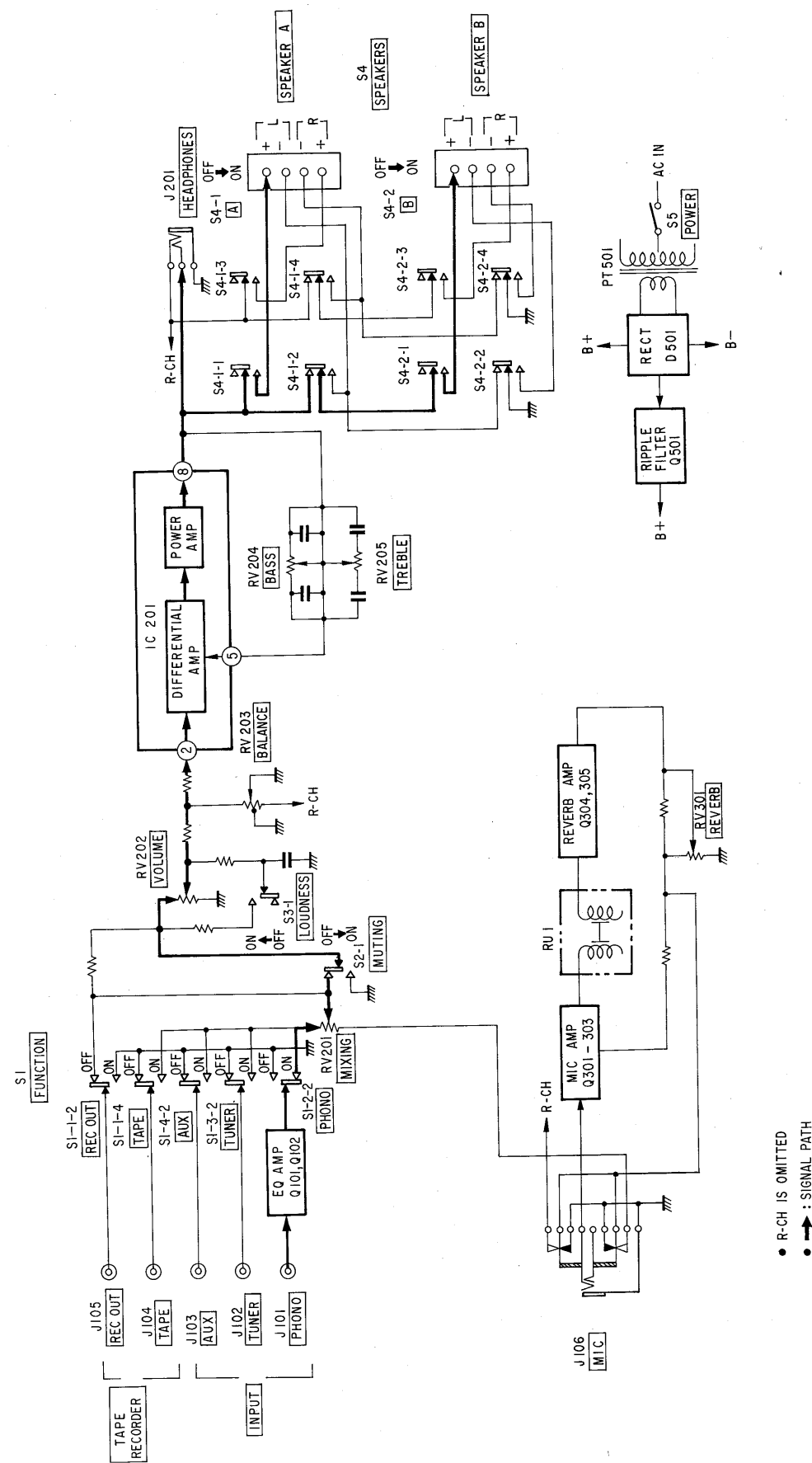


Fig. 3

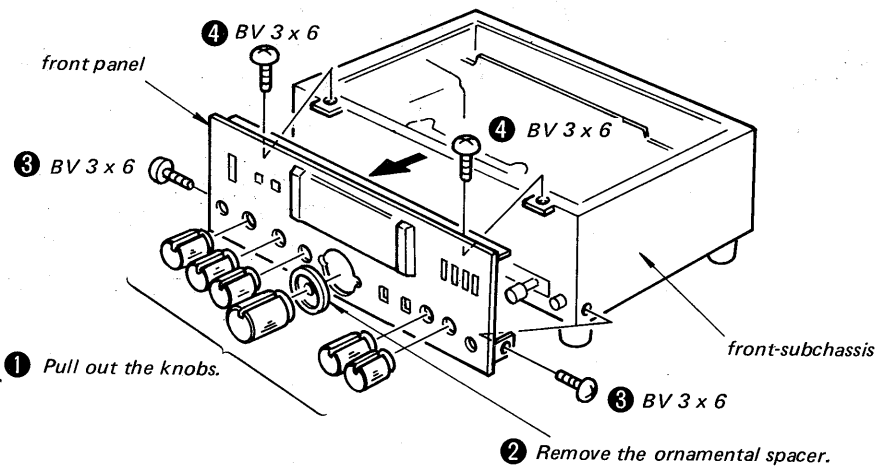
## SECTION 2 DISASSEMBLY

### 1-2. BLOCK DIAGRAM



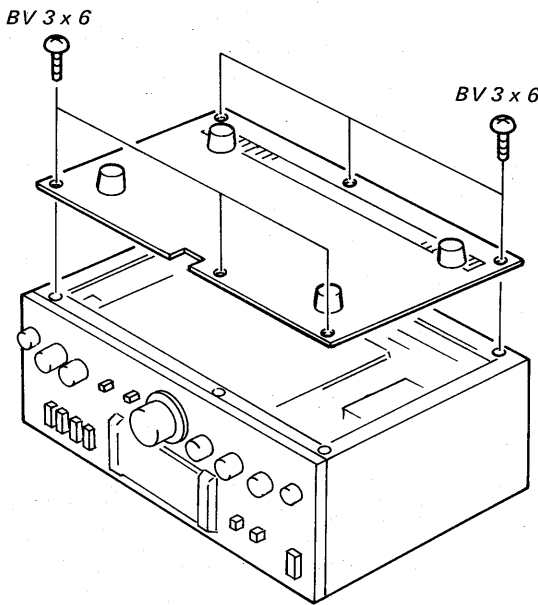
### 2-1. FRONT PANEL REMOVAL

- Follow the disassembly procedure in the numerical order given.



Do not bend the panel corners  
it may be damaged.

### 2-2. BOTTOM PLATE REMOVAL



## SECTION 3

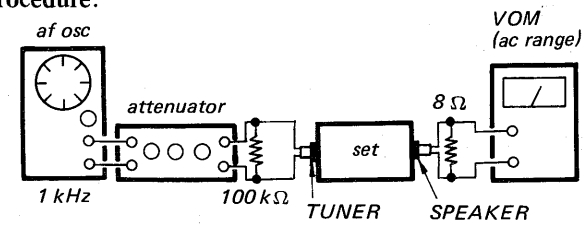
### ADJUSTMENT

### Meter Level Adjustment

**Setting:**

FUNCTION switch:      TUNER

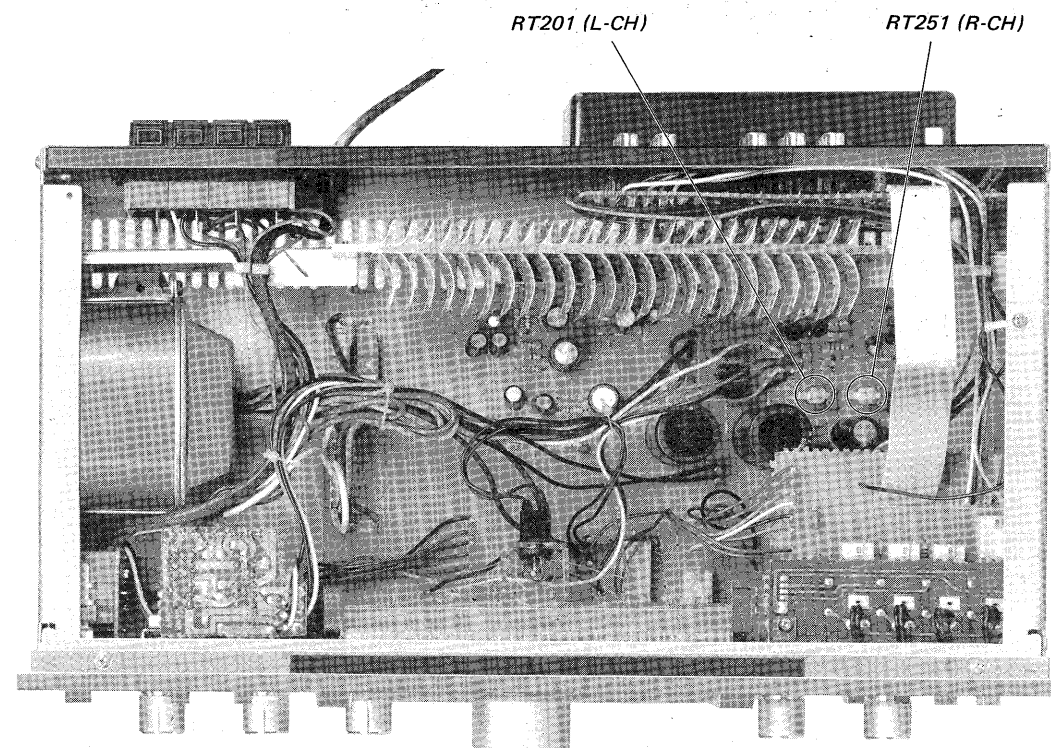
**Procedure:**



1. Turn the **VOLUME** control fully clockwise.
2. Adjust the **TUNER** input level for 2.83 V (1 W) reading on the **VOM**.
3. Adjust **RT201** (L-CH) and **RT251** (R-CH) so that the **WATTS/8  $\Omega$**  meter indicates 1 W.

**Adjustment Location:**

— power amp board —



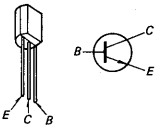
# MEMO



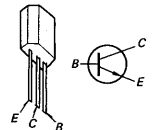
SECTION 4  
DIAGRAMS

4-1. MOUNTING  
DIAGRAM

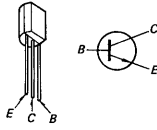
- Replacement Semiconductors  
For replacement, use semi-conductors except in ( ).  
Q101, 102  
Q151, 152 } 2SC1362  
Q301-305



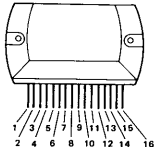
(2SC632A)



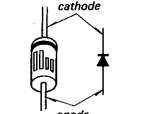
Q501: 2SC1364  
(2SC1634)



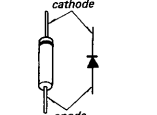
IC201: S1-1125HD



D201: EQB01-07  
(EQA01-07R)



D202, 203: 1T22AM  
D252, 253: 1T22A

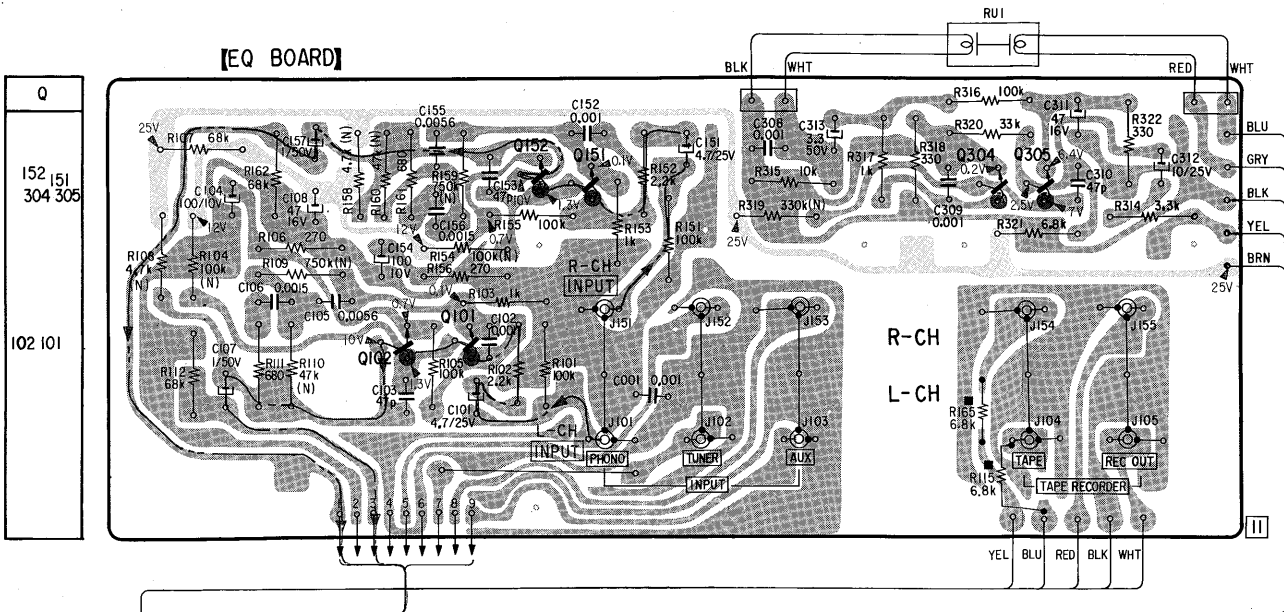


D501: S2VB20

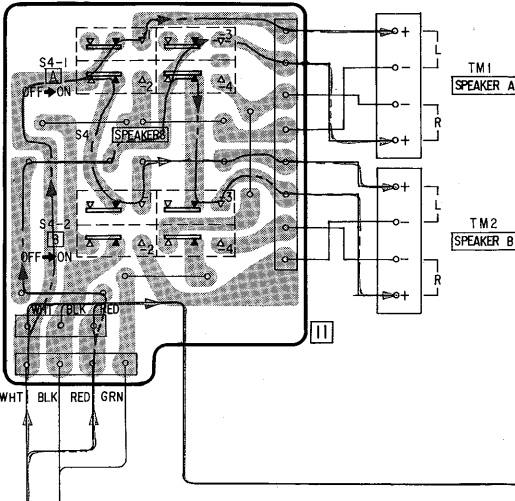
Note:

- : parts extracted from the component side.
- : parts extracted from the conductor side.
- : part mounted on the conductor side.
- : B+ pattern
- : B- pattern
- Signal Path  
---> L-CH  
---> R-CH

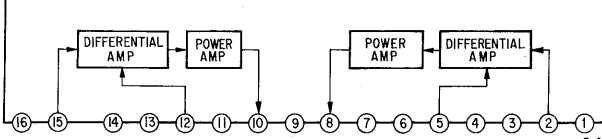
Readings are taken under no-signal (detuned) conditions with a VOM (20 kΩ/V).



[SPEAKER SWITCH BOARD]

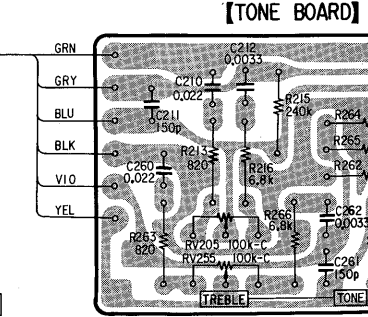
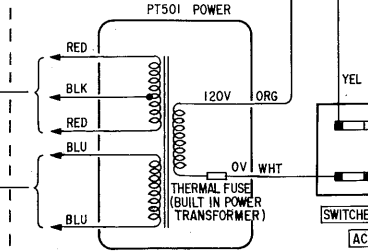
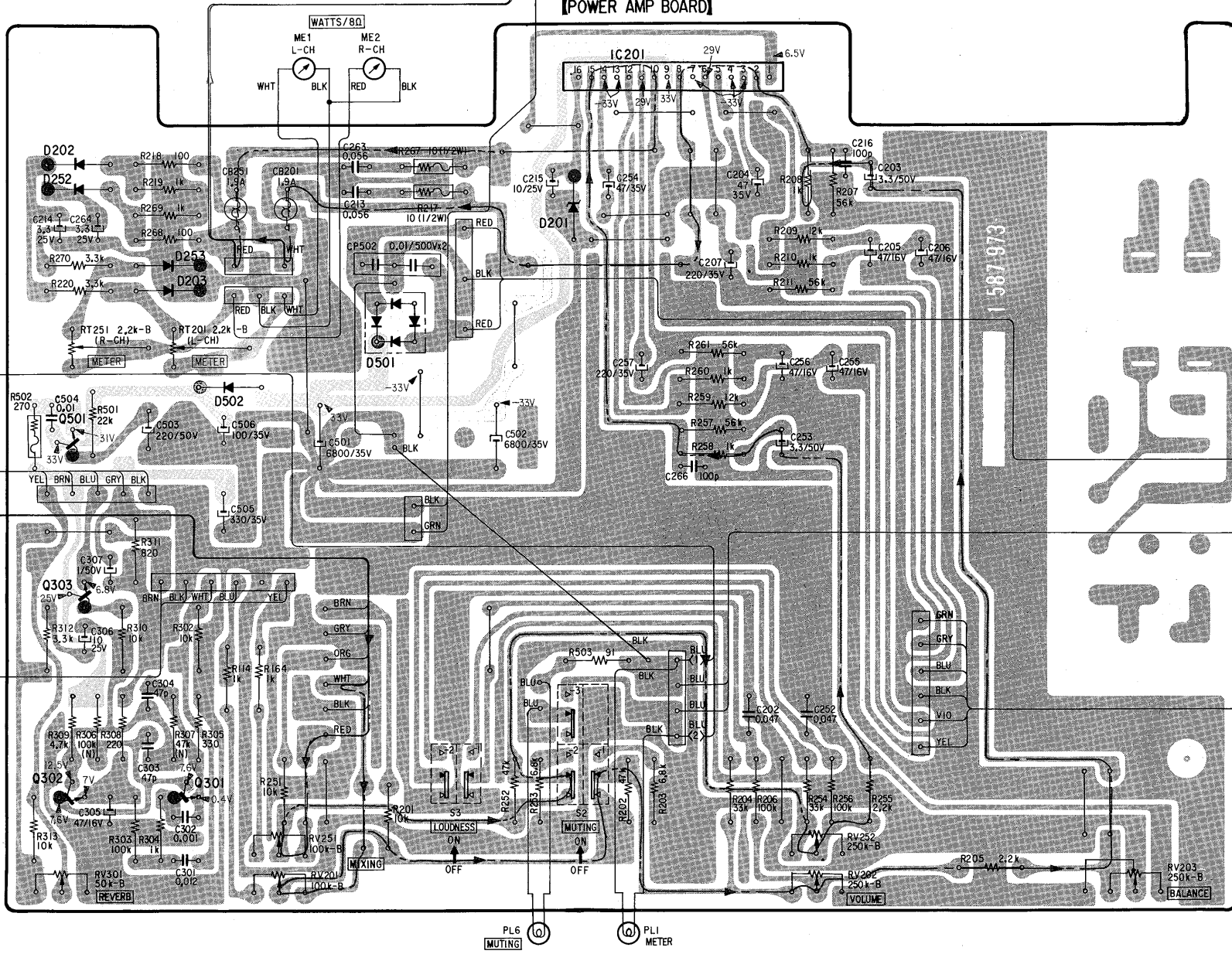
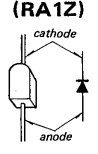
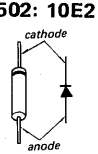
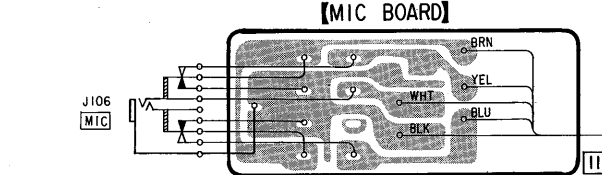
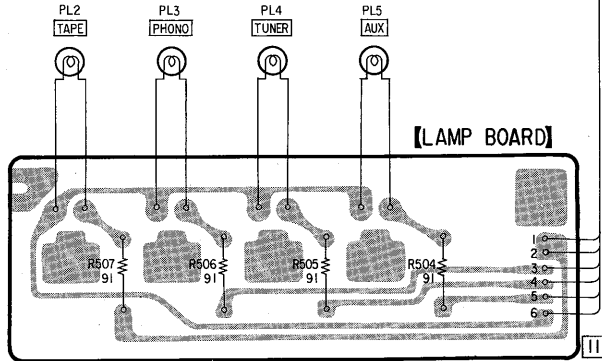
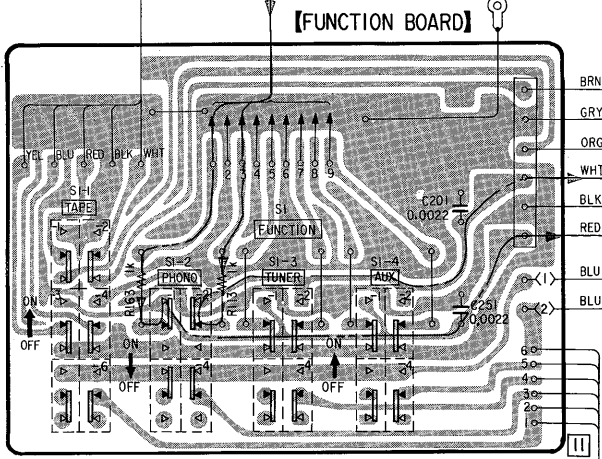
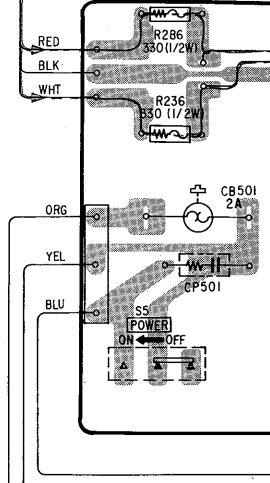


IC201 BLOCK DIAGRAM



CANADIAN MODEL

[HEADPHONE BOARD]



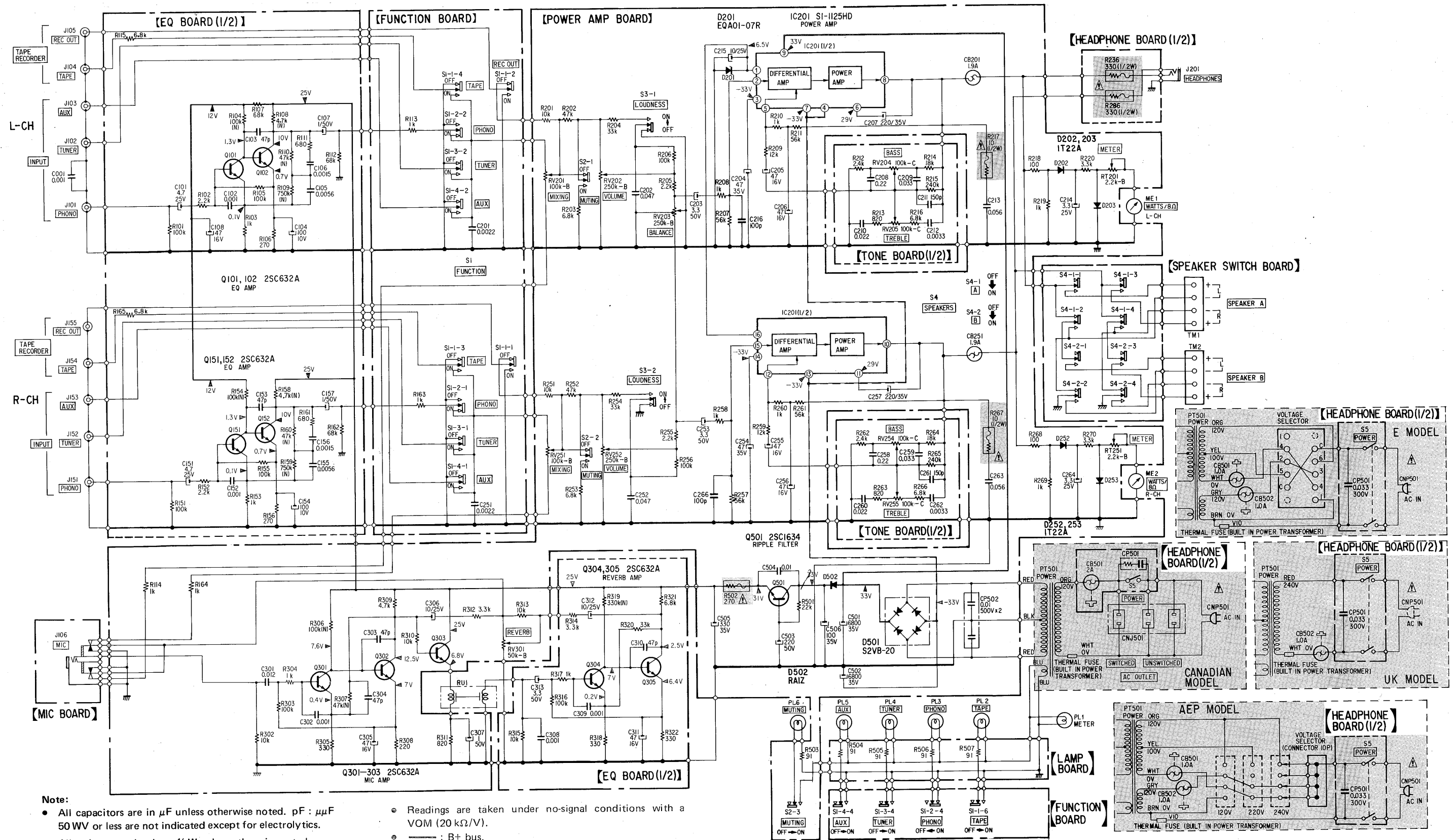
IC	501	303	301	502	501	201
Q	302	252	253	203		
D						





# 4-2. SCHEMATIC DIAGRAM

TA-313 TA-313



## Note:

- All capacitors are in  $\mu\text{F}$  unless otherwise noted.  $\text{pF} : \mu\text{F}$  50 WV or less are not indicated except for electrolytics.
- All resistors are in ohms,  $\frac{1}{4}\text{W}$  unless otherwise noted.  $\text{K}\Omega : 1000\Omega$ ;  $\text{M}\Omega : 1000\text{k}\Omega$
- Voltages are dc with respect to ground unless otherwise noted.
- Voltage variations may be noted due to normal production tolerances.
- $\square$ : nonflammable fusible resistor.
- (N): low-noise resistor.
- $\square$ : panel designation.
- $\square$ : adjustment for repair.

- Readings are taken under no-signal conditions with a VOM (20  $\text{k}\Omega/\text{V}$ ).
- : B+ bus.
- : B- bus.
- Switch

Ref.No.	Switch	Position
S1	FUNCTION	PHONO
S2	MUTING	OFF
S3	LOUDNESS	OFF
S4	SPEAKERS	OFF
S5	POWER	OFF

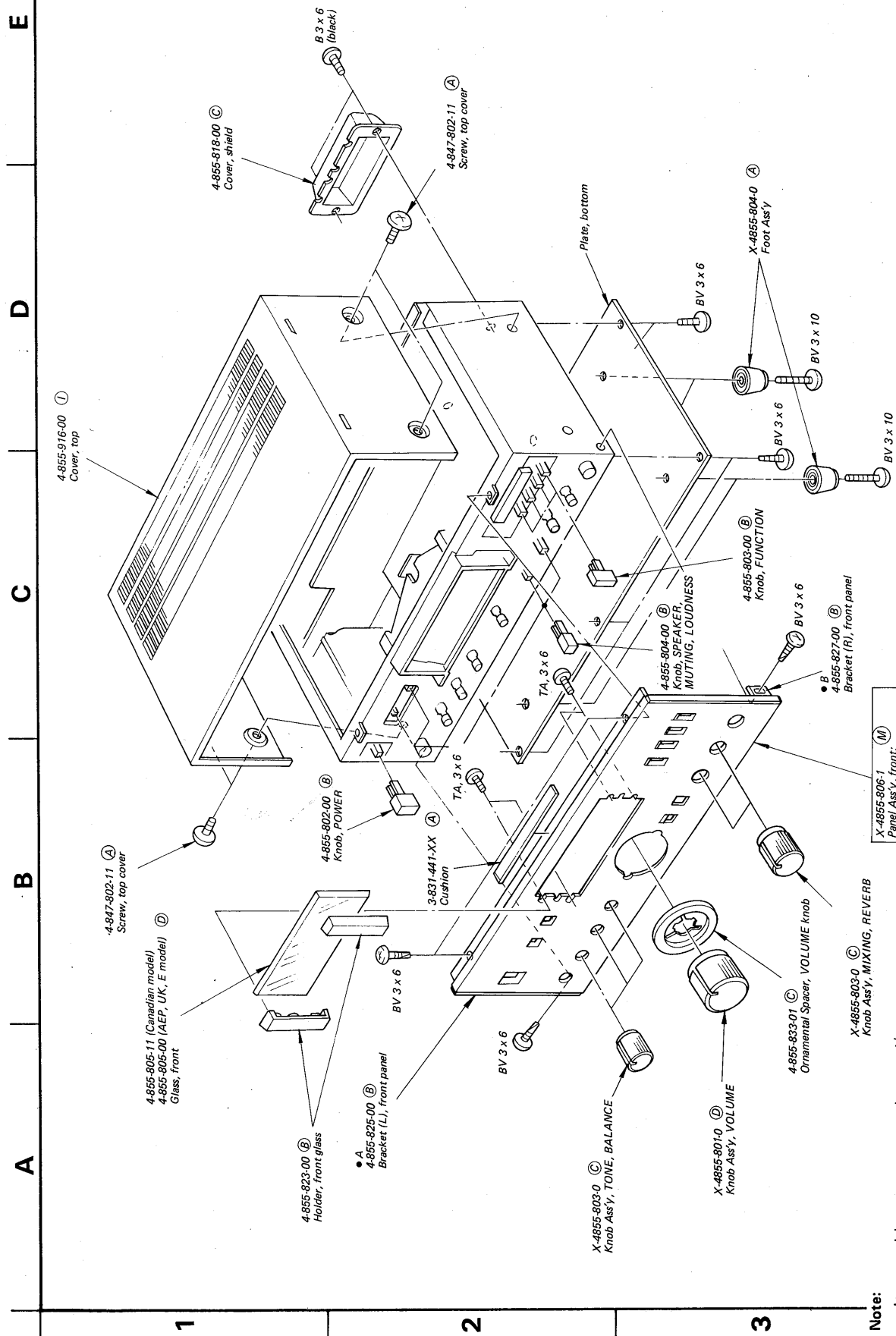
Note: The components identified by shading and mark  $\Delta$  are critical for safety. Replace only with part number specified.

Note: Les composants identifiés par un trame et une marque  $\Delta$  sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

## SECTION 5

### EXPLODED VIEWS

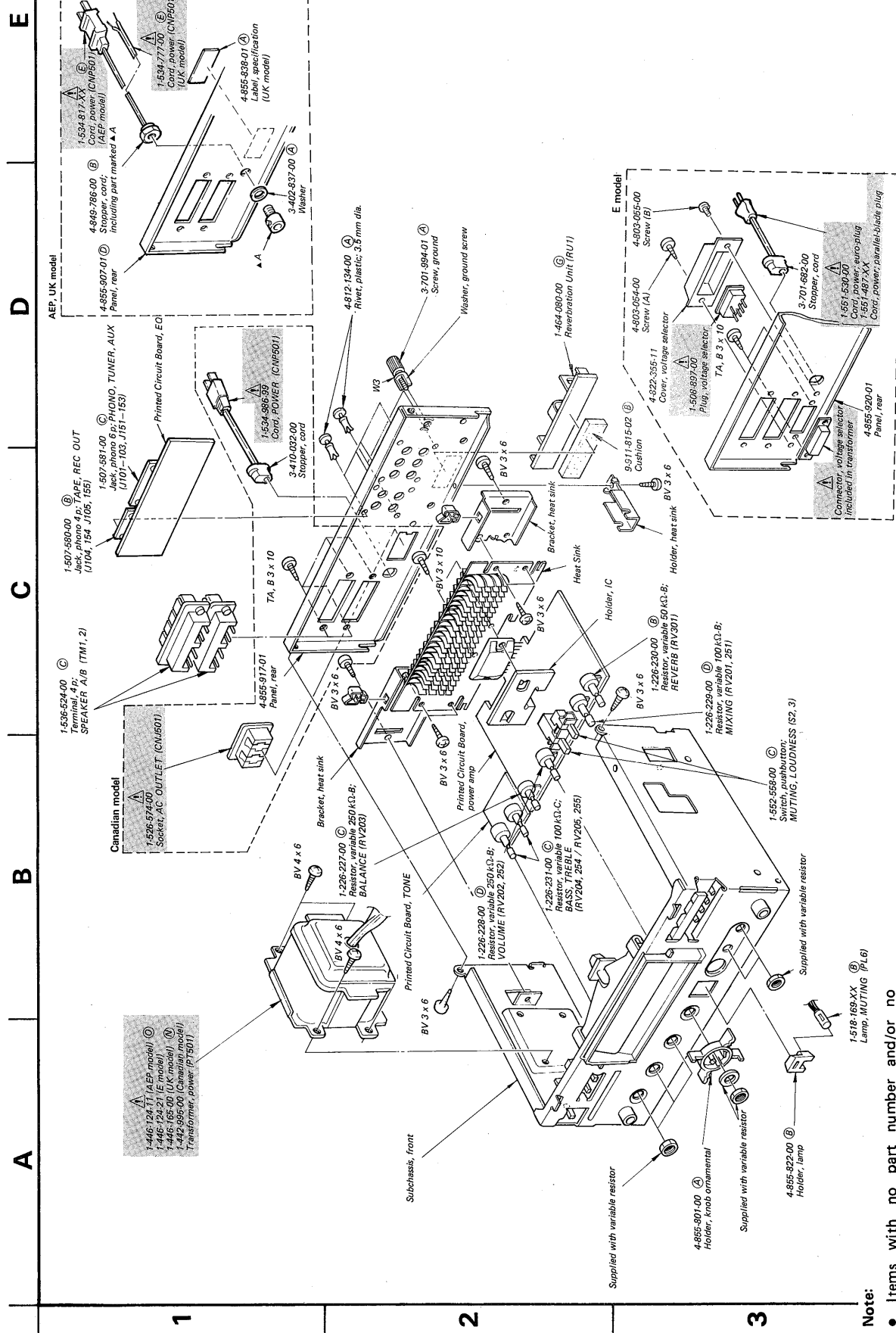
5-1.



**Note:**

- Items with no part number and/or no description are not stocked because they are seldom required for routine service.
- All screws are Phillips (cross recess) type unless otherwise noted.  
(—) = slotted head
- Circled letters ( **A** ) to ( **Z** ) are applicable to European models only.


**5-2.**



**Note:**

- Items with no part number and/or no description are not stocked because they are seldom required for routine service.
- All screws are Phillips (cross recess) type unless otherwise noted.  
(—) = slotted head
- Circled letters ( **A** to **Z** ) are applicable to European models only.

**Note:** Les composants identifiés par un tramé et une marque  $\Delta$  sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

**Note:** The components identified by shading and mark  are critical for safety. Replace only with part number specified.




## ELECTRICAL PARTS LIST

**Note:** Circled letters ( **A** to **Z** ) are applicable to European models only.



**Note:** Les composants identifiés par un tramé et une marque  $\Delta$  sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

**Note:** The components identified by shading and mark  are critical for safety. Replace only with part number specified.

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- Items with no part number and/or no description are not stocked because they are seldom required for routine service.
- All screws are Phillips (cross recess) type unless otherwise noted.  
(—) = slotted head
- Circled letters ( **A** to **Z** ) are applicable to European models only.

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
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## SEMICONDUCTORS

## Transistors

⇒ Q101, 151 } 8-729-665-47 (B) 2SC1362  
 ⇒ Q102, 152 }  
 ⇒ Q301-305 }  
 ⇒ Q501 8-729-663-47 (B) 2SC1364

## IC

IC201 8-759-301-25 (L) S1-1125HD

## Diodes

⇒ D201	8-719-931-07 (B) EQB01-07
⇒ D202, 252	8-719-422-21 (A) 1T22AM
⇒ D203, 253	
D501	8-719-502-20 (C) S2VB20
⇒ D502	8-719-200-02 (B) 10E2

## CAPACITORS

All capacitors are in  $\mu\text{F}$  and ceramic unless otherwise noted.  
50 WV or less are not indicated except for electrolytics.  
pF :  $\mu\mu\text{F}$ , elect : electrolytic.


C001	1-101-001-11	(A) 0.001	25 V	elect
C101, 151	1-121-915-11	(B) 4.7		
C102, 152	1-101-001-11	(A) 0.001		
C103, 153	1-101-880-11	(A) 47 p	10 V	elect
C104, 154	1-121-414-11	(A) 100		

C105, 155	1-108-355-12	(A) 0.0056		mylar
C106, 156	1-108-228-12	(A) 0.0015		mylar
C107, 157	1-121-391-11	(A) 1	50 V	elect
C108	1-121-409-11	(A) 47	16 V	elect

C201, 251	1-108-230-12	(A) 0.0022		mylar
C202, 252	1-108-246-12	(A) 0.047		mylar
C203, 253	1-123-393-11	(E) 3.3	50 V	elect
C204, 254	1-121-652-11	(A) 47	35 V	elect
C205, 255, C206, 256)	1-121-409-11	(A) 47	16 V	elect

C207, 257 1-121-655-11 (B) 220 35 V elect

⇒: Due to standardization, interchangeable replacements may be substituted for parts specified in the diagrams.

**Note:** Les composants identifiés par un trame et une marque  sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
-----------------	-----------------	--------------------

C208, 258	1-108-254-12	(B)	0.22	mylar
C209, 259	1-108-244-12	(A)	0.033	mylar
C210, 260	1-108-242-12	(A)	0.022	mylar
C211, 261	1-101-361-11	(A)	150 p	

C212, 262	1-108-232-12	(A) 0.0033		mylar
C213, 263	1-108-361-11	(A) 0.056		mylar
C214, 264	1-121-392-11	(A) 3.3	25 V	elect
C215	1-121-398-11	(A) 10	25 V	elect
C216, 266	1-102-973-11	(A) 100 p		

C301	1-108-357-12	(A) 0.012		mylar
C302	1-108-227-12	(A) 0.001		mylar
C303, 304	1-101-880-11	(A) 47 p		
C305	1-121-409-11	(A) 47	16 V	elect
C306	1-121-398-11	(A) 10	25 V	elect

C307	1-121-391-11	(A) 1	50 V	elect
C308	1-108-227-12	(A) 0.001		mylar
C309	1-101-001-11	(A) 0.001		
C310	1-101-880-11	(A) 47 p		
C311	1-121-409-11	(A) 47	16 V	elect

C312	1-121-398-11	(A)10	25 V	elect
C313	1-121-652-11	(A)3.3	50 V	elect


C501, 502	1-125-155-11	(E)	6800	35 V	elect
C503	1-121-423-11	(B)	220	50 V	elect
C504	1-108-239-12	(A)	0.01		mylar
C505	1-123-656-11	(B)	330	35 V	elect
C506	1-121-261-11	(B)	100	35 V	elect

## RESISTORS

All resistors are in ohms. Common 1/4W carbon resistors are omitted. Refer to the list on page 18 for their part numbers.  
k $\Omega$  : 1000  $\Omega$ , M $\Omega$  : 1000 k $\Omega$

R 217, 267	<u>A</u> 1-212-958-11	<u>A</u> 10	½ W	fusible (nonflammable)
R 236, 286	<u>A</u> 1-211-626-11	<u>A</u> 330	½ W	fusible (nonflammable)
R 502	<u>A</u> 1-212-891-11	<u>A</u> 270	¼ W	fusible (nonflammable)

RT201, 251 1-224-643-XX (B) 2.2 k-B, adjustable; meter  
RV201, 251 1-226-229-00 (D) 100 k-B, variable; MIXING

**Note:** The components identified by shading and mark  are critical for safety. Replace only with part number specified.

Note: Circled letters (A to Z) are applicable to European models only.

Ref. No.	Part No.	Description
RV202, 252	1-226-228-00	(D)250 k-B, variable; VOLUME
RV203	1-226-227-00	(C)250 k-B, variable; BALANCE
RV204, 254	1-226-231-00	(C)100 k-C, variable; BASS, TREBLE
RV205, 255		
RV301	1-226-230-00	(B)50 k-B, variable; REVERB

#### SWITCHES

S1	1-552-398-00	(F)Pushbutton, FUNCTION
S2, 3	1-552-558-00	(C)Pushbutton, MUTING, LOUDNESS
S4	1-552-557-00	(D)Pushbutton, SPEAKERS
S5	(A) 1-552-530-00	Pushbutton, POWER (Canadian model)
S5	(A) 1-552-531-00	(C)Pushbutton, POWER (AEP, UK, E model)

#### JACKS

J101-103	1-507-581-00	(C)Phono, 6-p; PHONO, TUNER, AUX
J151-153		
J104, 154	1-507-580-00	(B)Phono, 4-p; TAPE, REC OUT
J105, 155		
J106	1-507-589-00	(C)MIC
J201	1-507-561-00	(C)HEADPHONES

#### MISCELLANEOUS

CB201, 251	1-532-380-61	(C)Circuit Breaker, 1.9 A
CB501	(A) 1-532-486-12	Circuit Breaker, 2 A (Canadian model)
CB501	(A) 1-532-535-00	(C)Circuit Breaker, 1.0 A (AEP, E model)
CB502	(A) 1-532-535-00	(C)Circuit Breaker, 1.0 A (AEP, UK, E model)
CNJ501	(A) 1-526-574-00	Socket, AC OUTLET (Canadian model)

Note: Les composants identifiés par un trame et une marque A sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

Ref. No.	Part No.	Description
CNP501	(A) 1-534-817-XX	(E)Cord, power (AEP model)
CNP501	(A) 1-534-777-00	(E)Cord, power (UK model)
CNP501	(A) 1-534-986-99	Cord, power (Canadian model)
CNP501	(A) 1-534-487-XX	Cord, power; parallel-blade plug (E model)
CNP501	(A) 1-551-530-00	Cord, power; euro-plug (E model)
CP501	(A) 1-108-750-11	(C)Capacitor, 0.033 $\mu$ F/300 V; mylar (AEP, UK, E model)
CP501	(A) 1-231-341-00	Encapsulated Component (Canadian model)
CP502	1-102-355-00	(B)Capacitor, 0.01/500 V x 2; ceramic
ME1, 2	1-520-340-00	(L)Meter; WATTS/8 $\Omega$
PL1	1-518-297-00	(C)Lamp, 8 V/300 mA; meter
PL2-5	1-518-322-00	(B)Lamp, 4.5 V/40 mA; FUNCTION
PL6	1-518-169-XX	(B)Lamp, 4.5 V/40 mA; MUTING

PT501	(A) 1-446-124-11	(C)Transformer, power (AEP model)
PT501	(A) 1-446-124-21	Transformer, power (E model) (including voltage selector)
PT501	(A) 1-446-165-00	(N)Transformer, power (UK model)
PT501	(A) 1-442-995-00	Transformer, power (Canadian model)

RU1	1-464-080-00	(C)Reverbration Unit
TM1, 2	1-536-524-00	(C)Terminal, 4-p; SPEAKER A/B
	(A) 1-508-897-00	Plug, voltage selector (E model)

#### ACCESSORIES AND PACKING MATERIALS

Part No.	Description
3-701-630-00	(A)Bag, protector
3-770-554-11	(D)Manual, instruction
4-855-829-00	(B)Cushion
4-855-839-00	(D)Carton

Note: The components identified by shading and mark A are critical for safety. Replace only with part number specified.

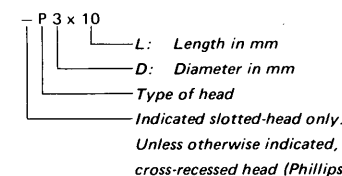
#### 1/4 WATT CARBON RESISTORS (A)

Note: Circled letter (A) is applicable to European models only.

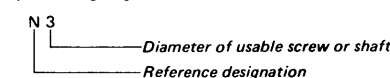
$\Omega$	Part No.	$\Omega$	Part No.	$\Omega$	Part No.	$\Omega$	Part No.	$\Omega$	Part No.	$\Omega$	Part No.	$\Omega$	Part No.	$\Omega$	Part No.
1.0	1-244-601-11	10	1-244-625-11	100	1-244-649-11	1.0k	1-244-673-11	10k	1-244-697-11	100k	1-244-721-11	1.0M	1-244-745-11		
1.1	1-244-602-11	11	1-244-626-11	110	1-244-650-11	1.1k	1-244-674-11	11k	1-244-698-11	110k	1-244-722-11	1.1M	1-244-746-11		
1.2	1-244-603-11	12	1-244-627-11	120	1-244-651-11	1.2k	1-244-675-11	12k	1-244-699-11	120k	1-244-723-11	1.2M	1-244-747-11		
1.3	1-244-604-11	13	1-244-628-11	130	1-244-652-11	1.3k	1-244-676-11	13k	1-244-700-11	130k	1-244-724-11	1.3M	1-244-748-11		
1.5	1-244-605-11	15	1-244-629-11	150	1-244-653-11	1.5k	1-244-677-11	15k	1-244-701-11	150k	1-244-725-11	1.5M	1-244-749-11		
1.6	1-244-606-11	16	1-244-630-11	160	1-244-654-11	1.6k	1-244-678-11	16k	1-244-702-11	160k	1-244-726-11	1.6M	1-244-750-11		
1.8	1-244-607-11	18	1-244-631-11	180	1-244-655-11	1.8k	1-244-679-11	18k	1-244-703-11	180k	1-244-727-11	1.8M	1-244-751-11		
2.0	1-244-608-11	20	1-244-632-11	200	1-244-656-11	2.0k	1-244-680-11	20k	1-244-704-11	200k	1-244-728-11	2.0M	1-244-752-11		
2.2	1-244-609-11	22	1-244-633-11	220	1-244-657-11	2.2k	1-244-681-11	22k	1-244-705-11	220k	1-244-729-11	2.2M	1-244-753-11		
2.4	1-244-610-11	24	1-244-634-11	240	1-244-658-11	2.4k	1-244-682-11	24k	1-244-706-11	240k	1-244-730-11	2.4M	1-244-754-11		
2.7	1-244-611-11	27	1-244-635-11	270	1-244-659-11	2.7k	1-244-683-11	27k	1-244-707-11	270k	1-244-731-11	2.7M	1-244-755-11		
3.0	1-244-612-11	30	1-244-636-11	300	1-244-660-11	3.0k	1-244-684-11	30k	1-244-708-11	300k	1-244-732-11	3.0M	1-244-756-11		
3.3	1-244-613-11	33	1-244-637-11	330	1-244-661-11	3.3k	1-244-685-11	33k	1-244-709-11	330k	1-244-733-11	3.3M	1-244-757-11		
3.6	1-244-614-11	36	1-244-638-11	360	1-244-662-11	3.6k	1-244-686-11	36k	1-244-710-11	360k	1-244-734-11	3.6M	1-244-758-11		
3.9	1-244-615-11	39	1-244-639-11	390	1-244-663-11	3.9k	1-244-687-11	39k	1-244-711-11	390k	1-244-735-11	3.9M	1-244-759-11		
4.3	1-244-616-11	43	1-244-640-11	430	1-244-664-11	4.3k	1-244-688-11	43k	1-244-712-11	430k	1-244-736-11	4.3M	1-244-760-11		
4.7	1-244-617-11	47	1-244-641-11	470	1-244-665-11	4.7k	1-244-689-11	47k	1-244-713-11	470k	1-244-737-11	4.7M	1-244-761-11		
5.1	1-244-618-11	51	1-244-642-11	510	1-244-666-11	5.1k	1-244-690-11	51k	1-244-714-11	510k	1-244-738-11	5.1M	1-244-762-11		
5.6	1-244-619-11	56	1-244-643-11	560	1-244-667-11	5.6k	1-244-691-11	56k	1-244-715-11	560k	1-244-739-11				
6.2	1-244-620-11	62	1-244-644-11	620	1-244-668-11	6.2k	1-244-692-11	62k	1-244-716-11	620k	1-244-740-11				
6.8	1-244-621-11	68	1-244-645-11	680	1-244-669-11	6.8k	1-244-693-11	68k	1-244-717-11	680k	1-244-741-11				
7.5	1-244-622-11	75	1-244-646-11	750	1-244-670-11	7.5k	1-244-694-11	75k	1-244-718-11	750k	1-244-742-11				
8.2	1-244-623-11	82	1-244-647-11	820	1-244-671-11	8.2k	1-244-695-11	82k	1-244-719-11	820k	1-244-743-11				
9.1	1-244-624-11	91	1-244-648-11	910	1-244-672-11	9.1k	1-244-696-11	91k	1-244-720-11	910k	1-244-744-11				

#### HARDWARE NOMENCLATURE

Screw:



Nut, Washer, Retaining ring:



Reference Designation	Shape	Description	Remarks
SCREWS			
P		pan-head screw	binding-head (B) screw for replacement
PWH		pan-head screw with washer face	binding-head (B) screw and flat washer for replacement
PS		pan-head screw with spring washer	binding-head (B) screw and spring washer for replacement
PSP			
PSW		pan-head screw with spring and flat washers	binding-head (B) screw and spring and flat washers for replacement
PSPW			
R		round-head screw	binding-head (B) screw for replacement
K		flat-countersunk-head screw	
RK		oval-countersunk-head screw	
B		binding-head screw	
T		truss-head screw	binding-head (B) screw for replacement
F		flat-fillister-head screw	
RF		fillister-head screw	
BV		braizer-head screw	

Reference Designation	Shape	Description	Remarks
SELF-TAPPING SCREWS			
TA		self-tapping screw	ex: TA, P 3 x 10
PTP		pan-head self-tapping screw	binding-head self-tapping (TA, B) screw for replacement
PTPWH		pan-head self-tapping screw with washer face	binding-head self-tapping (TA, B) screw and flat washer for replacement
PTTWH		pan-head thread-rolling screw with washer face	binding-head (B) screw and flat washer for replacement
SET SCREWS			
SC		set screw	
SC		hexagon-socket set screw	ex: SC 2.6 x 4, hexagon socket
NUT			
N		nut	
WASHERS			
W		flat washer	
SW		spring washer	
LW		internal-tooth lock washer	ex: LW3, internal
LW		external-tooth lock washer	ex: LW3, external
RETAINING RINGS			
E		retaining ring	
G		grip-type retaining ring	

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